

Mistaken Assertions on Reducing Motor Vehicle Injury

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Evans' "Comment"¹ on driver behavior includes mistaken assertions. He says that programs that change driver behavior are more effective than those that change vehicles and environment. My study of vehicle modifications, belt-use laws, and alcohol reductions indicates otherwise.² When the coefficients on model year-specific changes in deaths per mile are multiplied by the relevant numbers of model years, and when the coefficients for changes in belt use and alcohol are multiplied by changes in those factors during 1975 through 1992, the results indicate that far more reductions are due to vehicle modifications. The study controlled for vehicle age, vehicle size, fluctuations in the economy, and secular trend.

From the 1966 model through the 1977 model passenger cars, the reduction was an average 0.26 deaths per 100 million vehicle miles per model year for the 12 model years, for a total reduction of 3.12 deaths per 100 million vehicle miles ($12 \times .26$). The reduction in the 1980 through 1990 models was 0.077 per model year for a total reduction of 0.847 per 100 million vehicle miles ($11 \times .077$) in those model years.

Increased seat-belt use and reduced alcohol use accounted for smaller but significant reductions. Belt use was increased by about 40 percentage points by belt-use laws in the late 1980s, and alcohol involvement declined about 20 percentage points. The total effects are $.007 \times 40 = 0.28$ per million vehicle miles for belts and $.007 \times 20 = 0.14$ per million vehicle miles for alcohol.

As a check on the regression estimates of belt-use effects, consider that belt use was approximately 53% in 1991. If the remaining 47% of car occupants had

been restrained, the occupant fatality rate of 1.6 per 100 million miles would have been reduced by about 21%, that is, $.007 \times 47 = .329$ and divided by the death rate, $.329/1.6 = 0.21$. The implied effectiveness of belts when used is then 21/47 or 45%, near Evans' estimate of 41% based on other methods.³

Evans claims that the differences in death rates among model years is attributable to vehicle age. This myth was created by antiregulation economists to counter my original studies of regulation.⁴ In my recent study, vehicle age was controlled in the regression. The death rates in 10- to 15-year-old models manufactured in 1975 through 1977 compared with 10- to 15-year-old models manufactured in 1965 through 1967 clearly show greatly reduced rates attributable to increased vehicle crashworthiness independent of vehicle age. Graphs are available on request.

The public policy choice has never been starkly either behavior change or vehicle and environmental change. Evans' claim that behavioral change programs were somehow neglected because of vehicle-change programs is not true. During the period that the federal government was active in regulating motor vehicle safety, it also allocated large amounts of money to the states for safety programs. During 1975 through 1979, for example, more than \$600 million was spent. Unfortunately, some of the money was spent on high school driver education, which increased teenage driving without reducing the number of crashes per driver, thus increasing deaths. This offset some if not all of the positive effects

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of the other funded programs on injury reduction.⁵

I know of no one who denies that behavior is a factor in motor vehicle injuries, but it is quite clear that when vehicles have been made more crashworthy, deaths and severe injuries have been reduced irrespective of behavior. Evans adds parenthetically after "driver behavior," "what the driver chooses to do." In other words, all driver error is, to Evans, a matter of choice. His own research contradicts that inference.

In an experiment regarding the effect of sight and sound on vehicle occupants' perception of speed, Evans reported that without modifications of sight or sound, people exhibited an SD of 8.4 miles per hour in judging their speeds. In other words, a third of the subjects were off by more than 8 miles per hour even when their attention was abnormally focused on speed estimation because of the design of the experiment. In one treatment of the experiment, sound exclusion was a primary factor in further distorting perception of speed.⁶ Yet Evans' employer, General Motors, and other manufacturers promote "quiet" vehicles that baffle normal noise.

General Motors has also contributed to lack of the choice of whether to drive as well as to the lack of driver choice. The company was convicted of antitrust viola-

tions when it conspired with an oil company and tire company. The three companies bought and dismantled 40 mass transit companies in 16 states during the 1920s and 1930s.⁷ A half-century later, General Motors promised to install air bags on all cars by 1974, reneged on the deal, and, along with other manufacturers, offered no air bags even as an option during the decade after 1977. New car buyers were denied the choice of air bags. Evans cannot be blamed for these actions of his employer, but his denial of acting in General Motors' interest in promoting heavier cars and deflecting attention from vehicle crashworthiness by emphasizing driver "choice" is disingenuous.

Each program to reduce injury and disease, whatever the approach, should be submitted to rigorous scientific scrutiny, preferably without our having to deal with industry spin doctors when the results are produced. The article that was supposedly the focus of Evans' "Comment" illustrates that a multifactor communitywide program in 6 Massachusetts communities had lower death rates during the 5 program years compared with 5 other communities that qualified but were not funded.⁸ A total of 30 communities applied for the funds, but dozens of others did not. Without detracting from the accomplishment of communities that put forth the effort, policymakers must con-

sider that the majority of communities in the state did not, for whatever reason, apply for the funds. Perhaps more communities will do so if more money is available, but let us find out before claiming this program is the optimal solution to the problem of motor vehicle injury. □

References

1. Evans L. Comment: the dominant role of driver behavior in traffic safety. *Am J Public Health*. 1996;86:784-786.
2. Robertson LS. Reducing death on the road: the effects of minimum safety standards, publicized crash tests, seat belts, and alcohol. *Am J Public Health*. 1996;86:31-34.
3. Evans L. The effectiveness of seat belts in preventing fatalities. *Accid Anal Prev*. 1986;18:229-241.
4. Robertson LS. *Injury Epidemiology*. New York, NY: Oxford University Press; 1992.
5. Robertson LS. Federal funds and state motor vehicle deaths. *J Public Health Policy*. 1984;5:376-386.
6. Evans L. Speed estimation from a moving automobile. *Ergonomics*. 1970;13:219-230.
7. Adams W, Brock JW. Bigness and social efficiency: a case study of the US auto industry. In: Samuels WJ, Miller AS, eds. *Corporations and Society: Power and Responsibility*. New York, NY: Greenwood Press; 1987.
8. Hingson R, McGovern T, Howland J, Heeren T, Winter M, Zakocs R. Reducing alcohol-impaired driving in Massachusetts: the Saving Lives Program. *Am J Public Health*. 1996;86:791-797.